

REMARKS

Claims 1-20 are in this application and are presented for reconsideration. By this amendment, Applicant has made minor changes to the independent claims.

An important aspect of the invention is the provision of spacing metallizations in which there is only a partial fusion or partial melting of the spacing metallizations. This necessarily requires that a portion of the metallization is maintained in a solid state. Applicant has highlighted this by amending claim 1 to note that the spacing metallization is maintained in a solidified state with regard to the portion not bonding, namely an essential part of the spacing metallization is in a solidified or solid state through the bonding procedure. This presents a structural feature in the resulting product in that the spacing metallization maintained in a solid state is maintained rigid and provides a defined spacing or defined dimension. The feature is highlighted in independent claim 12 wherein it is noted that a portion of the spacing metallization in a region of the terminal area is fused. The claim now further highlights an essential part of the spacing metallization as maintained in a solid state as part of this process. This issue was already presented in the claims including claim 17 which highlights that a majority portion of the spacing metallization is in its solid state.

The features claimed are important with regard to a process which produces a dependable or reliable product with standardized form. It is Applicant's position that the prior art as a whole fails to teach and fails to suggest the combination of features highlighted in the method and apparatus claims.

Claims 1-9, 12-15 and 17-20 have been rejected as being obvious based on the

teachings of Leicht et al. (US 5,551,627) in view of Gotman (US 4,404,453).

The rejection is based on the position that Leicht teaches some features of the invention and Gotman teaches a process wherein it is suggested to maintain the spacing metallization in a solid state except where fused. It is Applicant's position that the references do not suggest this.

The rejection considers the Leicht et al. reference as teaching a process producing a contact structure for connecting two substrates with steps including applying solder material to a terminal in order to form spacing metallization with the further step of bonding the first substrate to the second substrate. However, Leicht et al. teaches the bonding action using fillets. These are preferably made of metal alloy solder. This enables the bonding of the spacing metallizations to the terminals of the substrates while maintaining spherical shape of the spacing metallizations. Accordingly, the Leicht et al. reference directs a person of ordinary skill in the art toward a very different solution.

Clearly the Leicht et al. reference does not teach and does not suggest a partial fusing of the spacing metallizations in order to bond the two substrates via the spacing metallizations. As such Leicht teaches away from the invention.

The rejection turns to the Gotman reference for providing the missing teachings and suggestions.

It is Applicant's position that the Gotman reference does not provide any suggestion with regard to a partial fusion of the spacing metallizations while maintaining the spacing function. Considering the entire Gotman reference and fairly considering the teachings it can

be appreciated that the end of the bonding action between the chip 20 and the substrate 10 (see Figure 1) as well as the bonding action between the chip 60 and substrate 70 (see Figure 2) or carried by a total fusion. This is not a partial fusion of the solder globules 12 or 22 (Figure 1) or 62 and 72 (as per Figure 2). The fact that a total fusion is taught can be appreciated from considering column 3 lines 19-26 and column 4 lines 27-31. Particularly it is noted that in a first step, upon heating of the chip 20 the solder globules 22 will become partially liquified. The partial liquification has a duration which is as long as there is contact between solder globules 22 and globules 12. In a subsequent second step the heat flow is continued. Such a continuation of the heat flow necessarily results in the melting of the globules 12. This action produces an effective fusion between contact pairs 21 and 22 (see Figure 1). It can be appreciated that the melting of the globules 20 can only occur upon the melting of the globules 22 because of the heat flow from the chip 20 via the globules 22 into the globules 12. The steps of carrying out the bonding action with respect to Figures 2 corresponding to those of Figure 1. Accordingly a partial fusion of the globules 22 (Figure 1) and the globules 72 (Figure 2) only occurs prior to the contact between the contact pairs 21, 11 or the contact pairs 71 and 61. Upon the contact, the globules 12 and 22 as well as the globules 72 and 62 become fused entirely. Such a fusion will result in no portion of the globules being maintained in a solid or solidified state. As such, Gotman clearly does not provide the spacing function and does not direct the person of ordinary skill in the art toward the feature for which it is cited.

As mentioned at page 7, second paragraph of the application the partial fusion action

makes it possible based on an essential part of the spacing metallization still fulfilling its spacing function. By maintaining this is a solidified state precise spacing can be attained.

Although Applicant's claims as previously presented should favorably be considered with regard to the prior art, Applicant notes that the further clarification, which does not raise new issues makes the claims clearer and it is therefore requested that the amendment be entered and that the claims be favorably considered.

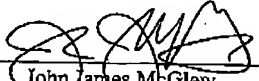
As the prior art fails to teach the crux of Applicant's invention and does not direct a person of ordinary skill in the art toward the invention it is requested that the Examiner favorably reconsider the rejections.

Favorable consideration on the merits is requested.

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